# Enhancing student teachers' digital learning knowledge and skills: an exploration of the integration of digital technology into an initial teacher education programme

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In a society driven by innovation, digital technologies are changing the way we communicate and work in the 21st century. At the core of improving the digital skills of the population and promoting innovation, teachers nowadays face great demands for the effective use of digital technology in their classrooms. As a result, Initial Teacher Education (ITE) programmes are compelled to provide future teachers with the learning experiences which reflect the increasing digitised society (Tømte, Enochsson, Buskqvist, & Kårstein, 2015). However, there remains a gap between the digital demands that teachers have to meet in their profession and the learning opportunities with which ITE programmes can provide them (e.g. Liu, 2016).

A close examination of the literature suggests that the ways in which student teachers use digital technology are often limited (e.g. Chien, Chang, Yeh, & Chang, 2012; Sadaf, Newby, & Ertmer, 2012; Tondeur et al., 2017). This is often the result of learning to use digital technology in isolated settings. In recent years, researchers begin to explore how the development of knowledge about technology overlaps with teachers' pedagogical and content knowledge. Considered as a complex and situated model of technology-enhanced teacher knowledge, the TPACK (technology, pedagogy and content knowledge) framework aims to address the gap between these three domains of knowledge (Herring, Koehler, & Mishra, 2016; Tømte et al., 2015). Researchers have examined a number of critical individual characteristics related to TPACK, such as ease of use, student teachers' attitudes, and self-efficacy. Building on Gronseth et al.'s (2010) study on subject-specific teacher education programmes, Mouza et al. (2014) investigated ways in which TPACK development can be supported through an integrated approach for Primary student teachers. Their approach aimed to facilitate a theory to practice connection linking university-based learning with school-based learning. They found that participants experienced significant gains in all aspects of TPACK. However, they note that the majority of practices merely considers the use of digital content and presentation technologies as a way of integration. This results in the limited ways in which technology integration has been modelled in university-based teaching practices. They also suggest that some student teachers are able to achieve higher levels of TPACK development where they progress to the adapting and exploring levels.

Teachers often use technology to address both professional needs and student needs, which aligns with their value beliefs. According to Pajares (1992), the holistic organisation of clusters of beliefs forms one's attitudes towards a situation. Teacher's attitudes about the integration of

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technology in the classroom, therefore, are contingent upon the overall perceived usefulness of technology. Avidov-Ungar and Eshet (2011) claim that a positive attitude is key to teachers' use of ICT in education. Negative beliefs about the potential of technology in education are less likely to lead teachers to use it in practice (e.g. Kim, Kim, Lee, Spector, & DeMeester, 2013). Nevertheless, Sadaf et al. (2012) indicate that there is a discrepancy between student teachers' positive attitudes towards ICT integration in education and their actual implementation of it in the classroom. Similarly, So and Kim (2009) argue that having TPACK did not guarantee that teachers would have the confidence or be able to use it in practice. They argue for the contextual nature of teachers' thinking. This points out that TPACK, both as domains of knowledge and its application in practice, requires teachers to develop strategies which are context sensitive; such an understanding subsequently has implications for how the development of TPACK can be accessed and facilitated.

# Method

The present study used the TPACK model as a theoretical lens to discuss the integration of digital technology into an ITE programme in Scotland. The analysis was informed by a conceptual understanding of sociocultural theorising (Wertsch, 1985) and teacher professional learning as reflective practices (Schön, 1983). The participants were student teachers on an undergraduate ITE programme (Primary Education) at the University of Strathclyde. The study adopted a case study design with the aim of building on our current thinking about technology integration in teacher education programmes. We explored the ways in which student teachers developed professional digital competence and their understanding of the role of digital technology in their own teaching. To this end, we ask the following research questions: • How do student teachers perceive their experience of developing professional digital competence during initial teacher education? • To what extent does this relate to their understanding of the role of digital technology in their own teaching? In order to answer the research questions, we drew from the multiple data sources. Students first undertook self-directed learning by completing digital tools and digital pedagogy courses online. They then participated in an asynchronous discussion forum where they shared good practice and debated key digital learning issues. Following that, students created an online portfolio reflecting and recording the development of digital competence. All students were then invited to a one-on-one interview with the research team which was audio recorded.

# Expected Outcomes

The analysis is still ongoing. However, from the initial analysis, can see patterns emerging. This presentation will explore how Primary student teachers engage with the online courses on digital tools and digital pedagogy as part of their professional learning. Furthermore, we will map student teachers' online discussion, reflection and follow-up interviews to the TPACK framework. The TPACK framework is particularly useful for examining the development of technology, pedagogy and content knowledge as a result of the learning cycle. This presentation will also highlight how

student teachers perceive the role of digital technology in their own teaching practice by exploring participants attitudes and intentions. Initial findings are in line with previous research in that they suggest that students value the integration of digital learning in their teacher education programme. However, their discussion tend to focus more than the use of digital tools rather than exploring the impact of digital pedagogy. While the student teachers in the present study have developed a positive attitudes towards effective use of digital technology, they also recognise the challenges (both internal and external) that they may face. The paper contributes to the European and international debates about the ways in which digital technology can be integrated in initial teacher education programmes. Set in the context of Scottish education, it is expected that this paper and its findings will inform the use of innovative methods for integrating digital technology in teacher education around the globe.

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